

SEQUENCE LISTING

<110> Apicella, Michael A.
Edwards, Jennifer L.

<120> Vaccine and compositions for the prevention and treatment of Neisserial infections

<130> 875.0096US1

<150> US 10/621,184
<151> 2003-07-15

<150> US 10/066,551
<151> 2002-01-31

<150> US 60/344,452
<151> 2001-10-23

<150> US 60/310,356
<151> 2001-08-06

<150> US 60/266,070
<151> 2001-01-31

<160> 32

<170> FastSEQ for Windows Version 4.0

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<211> 2015
<212> PRT
<213> Neisseria gonorrhoeae

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35 40 45
Gly Lys Leu Lys Thr Thr Leu Lys Thr Leu Val Cys Ser Leu Val Ser
50 55 60
Leu Ser Met Val Leu Pro Ala His Ala Gln Ile Thr Thr Asp Lys Ser
65 70 75 80
Ala Pro Lys Asn Gln Gln Val Val Ile Leu Lys Thr Asn Thr Gly Ala
85 90 95
Pro Leu Val Asn Ile Gln Thr Pro Asn Gly Arg Gly Leu Ser His Asn
100 105 110
Arg Tyr Thr Gln Phe Asp Val Asp Asn Lys Gly Ala Val Leu Asn Asn
115 120 125
Asp Arg Asn Asn Asn Pro Phe Leu Val Lys Gly Ser Ala Gln Leu Ile
130 135 140
Leu Asn Glu Val Arg Gly Thr Ala Ser Lys Leu Asn Gly Ile Val Thr
145 150 155 160
Val Gly Gly Gln Lys Ala Asp Val Ile Ile Ala Asn Pro Asn Gly Ile
165 170 175
Thr Val Asn Gly Gly Phe Lys Asn Val Gly Arg Gly Ile Leu Thr
180 185 190
Ile Gly Ala Pro Gln Ile Gly Lys Asp Gly Ala Leu Thr Gly Phe Asp
195 200 205

Val Arg Gln Gly Thr Leu Thr Val Gly Ala Ala Gly Trp Asn Asp Lys
 210 215 220
 Gly Gly Ala Asp Tyr Thr Gly Val Leu Ala Arg Ala Val Ala Leu Gln
 225 230 235 240
 Gly Lys Leu Gln Gly Lys Asn Leu Ala Val Ser Thr Gly Pro Gln Lys
 245 250 255
 Val Asp Tyr Ala Ser Gly Glu Ile Ser Ala Gly Thr Ala Ala Gly Thr
 260 265 270
 Lys Pro Thr Ile Ala Leu Asp Thr Ala Ala Leu Gly Gly Met Tyr Ala
 275 280 285
 Asp Ser Ile Thr Leu Ile Ala Asn Glu Lys Gly Val Gly Val Lys Asn
 290 295 300
 Ala Gly Thr Leu Glu Ala Ala Lys Gln Leu Ile Val Thr Ser Ser Gly
 305 310 315 320
 Arg Ile Glu Asn Ser Gly Arg Ile Ala Thr Thr Ala Asp Gly Thr Glu
 325 330 335
 Ala Ser Pro Thr Tyr Leu Ser Ile Glu Thr Thr Glu Lys Gly Ala Ala
 340 345 350
 Gly Thr Phe Ile Ser Asn Gly Gly Arg Ile Glu Ser Lys Gly Leu Leu
 355 360 365
 Val Ile Glu Thr Gly Glu Asp Ile Ser Leu Arg Asn Gly Ala Val Val
 370 375 380
 Gln Asn Asn Gly Ser Arg Pro Ala Thr Thr Val Leu Asn Ala Gly His
 385 390 395 400
 Asn Leu Val Ile Glu Ser Lys Thr Asn Val Asn Asn Ala Lys Gly Ser
 405 410 415
 Ala Asn Leu Ser Ala Gly Gly Arg Thr Thr Ile Asn Asp Ala Thr Ile
 420 425 430
 Gln Ala Gly Ser Ser Val Tyr Ser Ser Thr Lys Gly Asp Thr Glu Leu
 435 440 445
 Gly Glu Asn Thr Arg Ile Ile Ala Glu Asn Val Thr Val Leu Ser Asn
 450 455 460
 Gly Ser Ile Gly Ser Ala Ala Val Ile Glu Ala Lys Asp Thr Ala His
 465 470 475 480
 Ile Glu Ser Gly Lys Pro Leu Ser Leu Glu Thr Ser Thr Val Ala Ser
 485 490 495
 Asn Ile Arg Leu Asn Asn Gly Asn Ile Lys Gly Gly Lys Gln Leu Ala
 500 505 510
 Leu Leu Ala Asp Asp Asn Ile Thr Ala Lys Thr Thr Asn Leu Asn Thr
 515 520 525
 Pro Gly Asn Leu Tyr Val His Thr Gly Lys Asp Leu Asn Leu Asn Val
 530 535 540
 Asp Lys Asp Leu Ser Ala Ala Ser Ile His Leu Lys Ser Asp Asn Ala
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 Ala His Ile Thr Gly Thr Ser Lys Thr Leu Thr Ala Ser Lys Asp Met
 565 570 575
 Gly Val Glu Ala Gly Leu Leu Asn Val Thr Asn Thr Asn Leu Arg Thr
 580 585 590
 Asn Ser Gly Asn Leu His Ile Gln Ala Ala Lys Gly Asn Ile Gln Leu
 595 600 605
 Arg Asn Thr Lys Leu Asn Ala Ala Lys Ala Leu Glu Thr Thr Ala Leu
 610 615 620
 Gln Gly Asn Ile Val Ser Asp Gly Leu His Ala Val Ser Ala Asp Gly
 625 630 635 640
 His Val Ser Leu Leu Ala Asn Gly Asn Ala Asp Phe Thr Gly His Asn
 645 650 655
 Thr Leu Thr Ala Lys Ala Asp Val Asn Ala Gly Ser Val Gly Lys Gly
 660 665 670
 Arg Leu Lys Ala Asp Asn Thr Asn Ile Thr Ser Ser Ser Gly Asp Ile
 675 680 685
 Thr Leu Val Ala Gly Asn Gly Ile Gln Leu Gly Asp Gly Lys Gln Arg
 690 695 700

Asn Ser Ile Asn Gly Lys His Ile Ser Ile Lys Asn Asn Gly Gly Asn
 705 710 715 720
 Ala Asp Leu Lys Asn Leu Asn Val His Ala Lys Ser Gly Ala Leu Asn
 725 730 735
 Ile His Ser Asp Arg Ala Leu Ser Ile Glu Asn Thr Lys Leu Glu Ser
 740 745 750
 Thr His Asn Thr His Leu Asn Ala Gln His Glu Arg Val Thr Leu Asn
 755 760 765
 Gln Val Asp Ala Tyr Ala His Arg His Leu Ser Ile Thr Gly Ser Gln
 770 775 780
 Ile Trp Gln Asn Asp Lys Leu Pro Ser Ala Asn Lys Leu Val Ala Asn
 785 790 795 800
 Gly Val Leu Ala Leu Asn Ala Arg Tyr Ser Gln Ile Ala Asp Asn Thr
 805 810 815
 Thr Leu Arg Ala Gly Ala Ile Asn Leu Thr Ala Gly Thr Ala Leu Val
 820 825 830
 Lys Arg Gly Asn Ile Asn Trp Ser Thr Val Ser Thr Lys Thr Leu Glu
 835 840 845
 Asp Asn Ala Glu Leu Lys Pro Leu Ala Gly Arg Leu Asn Ile Glu Ala
 850 855 860
 Gly Ser Gly Thr Leu Thr Ile Glu Pro Ala Asn Arg Ile Ser Ala His
 865 870 875 880
 Thr Asp Leu Ser Ile Lys Thr Gly Gly Lys Leu Leu Leu Ser Ala Lys
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 Gly Gly Asn Ala Gly Ala Pro Ser Ala Gln Val Ser Ser Leu Glu Ala
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 Lys Gly Asn Ile Arg Leu Val Thr Gly Glu Thr Asp Leu Arg Gly Ser
 915 920 925
 Lys Ile Thr Ala Gly Lys Asn Leu Val Val Ala Thr Thr Lys Gly Lys
 930 935 940
 Leu Asn Ile Glu Ala Val Asn Asn Ser Phe Ser Asn Tyr Phe Pro Thr
 945 950 955 960
 Gln Lys Ala Ala Glu Leu Asn Gln Lys Ser Lys Glu Leu Glu Gln Gln
 965 970 975
 Ile Ala Gln Leu Lys Ser Ser Pro Lys Ser Lys Leu Ile Pro Thr
 980 985 990
 Leu Gln Glu Glu Arg Asp Arg Leu Ala Phe Tyr Ile Gln Ala Ile Asn
 995 1000 1005
 Lys Glu Val Lys Gly Lys Pro Lys Gly Lys Glu Tyr Leu Gln Ala
 1010 1015 1020
 Lys Leu Ser Ala Gln Asn Ile Asp Leu Ile Ser Ala Gln Gly Ile Glu
 1025 1030 1035 1040
 Ile Ser Gly Ser Asp Ile Thr Ala Ser Lys Lys Leu Asn Leu His Ala
 1045 1050 1055
 Ala Gly Val Leu Pro Lys Ala Ala Asp Ser Glu Ala Ala Ile Leu
 1060 1065 1070
 Ile Asp Gly Ile Thr Asp Gln Tyr Glu Ile Gly Lys Pro Thr Tyr Lys
 1075 1080 1085
 Ser His Tyr Asp Lys Ala Ala Leu Asn Lys Pro Ser Arg Leu Thr Gly
 1090 1095 1100
 Arg Thr Gly Val Ser Ile His Ala Ala Ala Leu Asp Asp Ala Arg
 1105 1110 1115 1120
 Ile Ile Ile Gly Ala Ser Glu Ile Lys Ala Pro Ser Gly Ser Ile Asp
 1125 1130 1135
 Ile Lys Ala His Ser Asp Ile Val Leu Glu Ala Gly Gln Asn Asp Ala
 1140 1145 1150
 Tyr Thr Phe Leu Lys Thr Lys Gly Lys Ser Gly Lys Ile Ile Arg Lys
 1155 1160 1165
 Thr Lys Phe Thr Ser Thr Arg Asp His Leu Ile Met Pro Ala Pro Val
 1170 1175 1180
 Glu Leu Thr Ala Asn Gly Ile Thr Leu Gln Ala Gly Gly Asn Ile Glu
 1185 1190 1195 1200

Ala Asn Thr Thr Arg Phe Asn Ala Pro Ala Gly Lys Val Thr Leu Val
 1205 1210 1215
 Ala Gly Glu Glu Leu Gln Leu Leu Ala Glu Glu Gly Ile His Lys His
 1220 1225 1230
 Glu Leu Asp Val Gln Lys Ser Arg Arg Phe Ile Gly Ile Lys Val Gly
 1235 1240 1245
 Lys Ser Asn Tyr Ser Lys Asn Glu Leu Asn Glu Thr Lys Leu Pro Val
 1250 1255 1260
 Arg Val Val Ala Gln Thr Ala Ala Thr Arg Ser Gly Trp Asp Thr Val
 1265 1270 1275 1280
 Leu Glu Gly Thr Glu Phe Lys Thr Thr Leu Ala Gly Ala Asp Ile Gln
 1285 1290 1295
 Ala Gly Val Gly Glu Lys Ala Arg Val Asp Ala Lys Ile Ile Leu Lys
 1300 1305 1310
 Gly Ile Val Asn Arg Ile Gln Ser Glu Glu Lys Leu Glu Thr Asn Ser
 1315 1320 1325
 Thr Val Trp Gln Lys Gln Ala Gly Arg Gly Ser Thr Ile Glu Thr Leu
 1330 1335 1340
 Lys Leu Pro Ser Phe Glu Ser Pro Thr Pro Pro Lys Leu Ser Ala Pro
 1345 1350 1355 1360
 Gly Gly Tyr Ile Val Asp Ile Pro Lys Gly Asn Leu Lys Thr Glu Ile
 1365 1370 1375
 Glu Lys Leu Ser Lys Gln Pro Glu Tyr Ala Tyr Leu Lys Gln Leu Gln
 1380 1385 1390
 Val Ala Lys Asn Ile Asn Trp Asn Gln Val Gln Leu Ala Tyr Asp Arg
 1395 1400 1405
 Trp Asp Tyr Lys Gln Glu Gly Leu Thr Glu Ala Gly Ala Ala Ile Ile
 1410 1415 1420
 Ala Leu Ala Val Thr Val Val Thr Ser Gly Ala Gly Thr Gly Ala Val
 1425 1430 1435 1440
 Leu Gly Leu Asn Gly Ala Ala Ala Ala Ala Thr Asp Ala Ala Phe Ala
 1445 1450 1455
 Ser Leu Ala Ser Gln Ala Ser Val Ser Phe Ile Asn Asn Lys Gly Asp
 1460 1465 1470
 Val Gly Lys Thr Leu Lys Glu Leu Gly Arg Ser Ser Thr Val Lys Asn
 1475 1480 1485
 Leu Val Val Ala Ala Ala Thr Ala Gly Val Ala Asp Lys Ile Gly Ala
 1490 1495 1500
 Ser Ala Leu Asn Asn Val Ser Asp Lys Gln Trp Ile Asn Asn Leu Thr
 1505 1510 1515 1520
 Val Asn Leu Ala Asn Ala Gly Ser Ala Ala Leu Ile Asn Thr Ala Ile
 1525 1530 1535
 Asn Gly Gly Ser Leu Lys Asp Asn Leu Gly Asp Ala Ala Leu Gly Ala
 1540 1545 1550
 Ile Val Ser Thr Val His Gly Glu Val Ala Ser Lys Ile Lys Phe Asn
 1555 1560 1565
 Leu Ser Glu Asp Tyr Ile Thr His Lys Ile Ala His Ala Ile Ala Gly
 1570 1575 1580
 Cys Ala Ala Ala Ala Asn Lys Gly Lys Cys Gln Asp Gly Ala Ile
 1585 1590 1595 1600
 Gly Ala Ala Val Gly Glu Ile Val Gly Glu Ala Leu Thr Asn Gly Lys
 1605 1610 1615
 Asn Pro Ala Thr Leu Thr Ala Lys Glu Arg Glu Gln Ile Leu Ala Tyr
 1620 1625 1630
 Ser Lys Leu Val Ala Gly Thr Val Ser Gly Val Val Gly Gly Asp Val
 1635 1640 1645
 Asn Thr Ala Ala Asn Ala Ala Lys Val Ala Ile Glu Asn Asn Leu Leu
 1650 1655 1660
 Ser Gln Glu Glu Tyr Ala Leu Arg Glu Lys Leu Ile Lys Lys Ala Lys
 1665 1670 1675 1680
 Gly Lys Gly Leu Leu Ser Leu Asp Trp Gly Ser Leu Thr Glu Gln Glu
 1685 1690 1695

Ala Arg Gln Phe Ile Tyr Leu Ile Glu Lys Asp Arg Tyr Ser Asn Gln
 1700 1705 1710
 Leu Leu Asp Arg Tyr Gln Lys Asn Pro Ser Ser Leu Asn Asn Gln Glu
 1715 1720 1725
 Lys Asn Ile Leu Ala Tyr Phe Ile Asn Gln Thr Ser Gly Gly Asn Thr
 1730 1735 1740
 Ala Trp Ala Ala Ser Ile Leu Lys Thr Pro Gln Ser Met Gly Asn Leu
 1745 1750 1755 1760
 Thr Ile Pro Ser Lys Asp Ile Asn Asn Thr Leu Ser Lys Ala Tyr Gln
 1765 1770 1775
 Thr Leu Ser Arg Tyr Asp Ser Phe Asp Tyr Lys Ser Ala Val Ala Ala
 1780 1785 1790
 Gln Pro Ala Leu Tyr Leu Leu Asn Gly Pro Leu Gly Phe Ser Val Lys
 1795 1800 1805
 Ala Ala Thr Val Ala Ala Gly Gly Tyr Asn Ile Gly Gln Gly Ala Lys
 1810 1815 1820
 Ala Ile Ser Asn Gly Glu Tyr Leu His Gly Thr Val Gln Val Val Asn
 1825 1830 1835 1840
 Gly Thr Leu Met Val Ala Gly Ser Val Ser Ala Gln Ala Ala Ile Ser
 1845 1850 1855
 Ala Lys Pro Ala Pro Val Thr Arg Tyr Leu Ser Asn Asp Ser Ala Pro
 1860 1865 1870
 Ala Leu Arg Gln Ala Leu Thr Ala Glu Ser Gln Arg Ile Arg Met Lys
 1875 1880 1885
 Leu Pro Glu Glu Tyr Arg Gln Ile Gly Asn Leu Ala Ile Ala Lys Ile
 1890 1895 1900
 Asp Val Lys Gly Leu Pro Gln Arg Met Glu Ala Phe Ser Ser Phe Gln
 1905 1910 1915 1920
 Lys Gly Glu His Gly Phe Ile Ser Leu Pro Glu Thr Lys Ile Phe Lys
 1925 1930 1935
 Pro Ile Ser Val Asp Lys Tyr His Asn Ile Ala Ser Pro Pro Arg Gly
 1940 1945 1950
 Thr Leu Arg Asn Ile Asp Gly Glu Tyr Lys Leu Leu Glu Thr Ile Ala
 1955 1960 1965
 Gln Gln Leu Gly Asn Asn Arg Asn Val Ser Gly Arg Ile Asp Leu Phe
 1970 1975 1980
 Thr Glu Leu Lys Ala Cys Gln Ser Cys Ser Asn Val Ile Leu Glu Phe
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 2005 2010 2015

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 Thr Glu Gln Ser Val Gly Leu Glu Thr Val Ser Val Val Gly Lys Ser
 35 40 45
 Arg Pro Arg Ala Thr Ser Gly Leu Leu His Thr Ser Thr Ala Ser Asp
 50 55 60
 Lys Ile Ile Ser Gly Asp Thr Leu Arg Gln Lys Ala Val Asn Leu Gly
 65 70 75 80
 Asp Ala Leu Asp Gly Val Pro Gly Ile His Ala Ser Gln Tyr Gly Gly
 85 90 95
 Gly Ala Ser Ala Pro Val Ile Arg Gly Gln Thr Gly Arg Arg Ile Lys
 100 105 110

Val Leu Asn His His Gly Glu Thr Gly Asp Met Ala Asp Phe Ser Pro
 115 120 125
 Asp His Ala Ile Met Val Asp Ser Ala Leu Ser Gln Gln Val Glu Ile
 130 135 140
 Leu Arg Gly Pro Val Thr Leu Leu Tyr Ser Ser Gly Asn Val Ala Gly
 145 150 155 160
 Leu Val Asp Val Ala Asp Gly Lys Ile Pro Glu Lys Met Pro Glu Asn
 165 170 175
 Gly Val Ser Gly Glu Leu Gly Leu Arg Leu Ser Ser Gly Asn Leu Glu
 180 185 190
 Lys Leu Thr Ser Gly Gly Ile Asn Ile Gly Leu Gly Lys Asn Phe Val
 195 200 205
 Leu His Thr Glu Gly Leu Tyr Arg Lys Ser Gly Asp Tyr Ala Val Pro
 210 215 220
 Arg Tyr Arg Asn Leu Lys Arg Leu Pro Asp Ser His Ala Asp Ser Gln
 225 230 235 240
 Thr Gly Ser Ile Gly Leu Ser Trp Val Gly Glu Lys Gly Phe Ile Gly
 245 250 255
 Ala Ala Tyr Ser Asp Arg Arg Asp Gln Tyr Gly Leu Pro Ala His Ser
 260 265 270
 His Glu Tyr Asp Asp Cys His Ala Asp Ile Ile Trp Gln Lys Ser Leu
 275 280 285
 Ile Asn Lys Arg Tyr Leu Gln Leu Tyr Pro His Leu Leu Thr Glu Glu
 290 295 300
 Asp Ile Asp Tyr Asp Asn Pro Gly Leu Ser Cys Gly Phe His Asp Asp
 305 310 315 320
 Asp Asp Ala His Ala His Asn Gly Lys Pro Trp Ile Asp Leu
 325 330 335
 Arg Asn Lys Arg Tyr Glu Leu Arg Ala Glu Trp Lys Gln Pro Phe Pro
 340 345 350
 Gly Phe Glu Ala Leu Arg Val His Leu Asn Arg Asn Asp Tyr Arg His
 355 360 365
 Asp Glu Lys Ala Gly Asp Ala Val Glu Asn Phe Phe Asn Asn Gln Thr
 370 375 380
 Gln Asn Ala Arg Ile Glu Leu Arg His Gln Pro Ile Gly Arg Leu Lys
 385 390 395 400
 Gly Ser Trp Gly Val Gln Tyr Leu Gly Gln Lys Ser Ser Ala Leu Ser
 405 410 415
 Ala Thr Ser Glu Ala Val Lys Gln Pro Met Leu Leu Asp Asn Lys Val
 420 425 430
 Gln His Tyr Ser Phe Phe Gly Val Glu Gln Ala Asn Trp Asp Asn Phe
 435 440 445
 Thr Leu Glu Gly Gly Val Arg Val Glu Lys Gln Lys Ala Ser Ile Arg
 450 455 460
 Tyr Asp Lys Ala Leu Ile Asp Arg Glu Asn Tyr Tyr Asn His Pro Leu
 465 470 475 480
 Pro Asp Leu Gly Ala His Arg Gln Thr Ala Arg Ser Phe Ala Leu Ser
 485 490 495
 Gly Asn Trp Tyr Phe Thr Pro Gln His Lys Leu Ser Leu Thr Ala Ser
 500 505 510
 His Gln Glu Arg Leu Pro Ser Thr Gln Glu Leu Tyr Ala His Gly Lys
 515 520 525
 His Val Ala Thr Asn Thr Phe Glu Val Gly Asn Lys His Leu Asn Lys
 530 535 540
 Glu Arg Ser Asn Asn Ile Glu Leu Ala Leu Gly Tyr Glu Gly Asp Arg
 545 550 555 560
 Trp Gln Tyr Asn Leu Ala Leu Tyr Arg Asn Arg Phe Gly Asn Tyr Ile
 565 570 575
 Tyr Ala Gln Thr Leu Asn Asp Gly Arg Gly Pro Lys Ser Ile Glu Asp
 580 585 590
 Asp Ser Glu Met Lys Leu Val Arg Tyr Asn Gln Ser Gly Ala Asp Phe
 595 600 605

Tyr Gly Ala Glu Gly Glu Ile Tyr Phe Lys Pro Thr Pro Arg Tyr Arg
 610 615 620
 Ile Gly Val Ser Gly Asp Tyr Val Arg Gly Arg Leu Lys Asn Leu Pro
 625 630 635 640
 Ser Leu Pro Gly Arg Glu Asp Ala Tyr Gly Asn Arg Pro Leu Ile Ala
 645 650 655
 Gln Ala Asp Gln Ala Pro Arg Val Pro Ala Ala Arg Leu Gly Val
 660 665 670
 His Leu Lys Ala Ser Leu Thr Asp Arg Ile Asp Ala Asn Leu Asp Tyr
 675 680 685
 Tyr Arg Val Phe Ala Gln Asn Lys Leu Ala Arg Tyr Glu Thr Arg Thr
 690 695 700
 Pro Gly His His Met Leu Asn Leu Gly Ala Asn Tyr Arg Arg Asn Thr
 705 710 715 720
 Arg Tyr Gly Glu Trp Asn Trp Tyr Val Lys Ala Asp Asn Leu Leu Asn
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 Gln Ser Val Tyr Ala His Ser Ser Phe Leu Ser Asp Thr Pro Gln Met
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 Gly Arg Ser Phe Thr Gly Gly Val Asn Val Lys Phe
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 35 40 45
 Ile Val Thr Leu Gln Gln Lys Asp Glu Ser Thr Ala Thr Asp Met Arg
 50 55 60
 Glu Leu Leu Lys Glu Glu Pro Ser Ile Asp Phe Gly Gly Asn Gly
 65 70 75 80
 Thr Ser Gln Phe Leu Thr Leu Arg Gly Met Gly Gln Asn Ser Val Asp
 85 90 95
 Ile Lys Val Asp Asn Ala Tyr Ser Asp Ser Gln Ile Leu Tyr His Gln
 100 105 110
 Gly Arg Phe Ile Val Asp Pro Ala Leu Val Lys Val Val Ser Val Gln
 115 120 125
 Lys Gly Ala Gly Ser Ala Ser Ala Gly Ile Gly Ala Thr Asn Gly Ala
 130 135 140
 Ile Ile Ala Lys Thr Val Asp Ala Gln Asp Leu Leu Lys Gly Leu Asp
 145 150 155 160
 Lys Asn Trp Gly Val Arg Leu Asn Ser Gly Phe Ala Ser Asn Glu Gly
 165 170 175
 Val Ser Tyr Gly Ala Ser Val Phe Gly Lys Glu Gly Asn Phe Asp Gly
 180 185 190
 Leu Phe Ser Tyr Asn Arg Asn Asp Glu Lys Asp Tyr Glu Ala Gly Lys
 195 200 205
 Gly Phe Arg Asn Val Asn Gly Gly Lys Thr Val Pro Tyr Ser Ala Leu
 210 215 220
 Asp Lys Arg Ser Tyr Leu Ala Lys Ile Gly Thr Thr Phe Gly Asp Asp
 225 230 235 240
 Asp His Arg Ile Val Leu Ser His Met Lys Asp Gln His Arg Gly Ile
 245 250 255
 Arg Thr Val Arg Glu Glu Phe Thr Val Gly Asp Lys Ser Ser Arg Ile
 260 265 270

Asn Ile Asp Arg Gln Ala Pro Ala Tyr Arg Glu Thr Thr Gln Ser Asn
 275 280 285
 Thr Asn Leu Ala Tyr Thr Gly Lys Asn Leu Gly Phe Val Glu Lys Leu
 290 295 300
 Asp Ala Asn Ala Tyr Val Leu Glu Lys Glu Arg Tyr Ser Ala Asp Asp
 305 310 315 320
 Ser Gly Thr Gly Tyr Ala Gly Asn Val Lys Gly Pro Asn His Thr Arg
 325 330 335
 Ile Thr Thr Arg Gly Ala Asn Phe Asn Phe Asp Ser Arg Leu Ala Glu
 340 345 350
 Gln Thr Leu Leu Lys Tyr Gly Ile Asn Tyr Arg His Gln Glu Ile Lys
 355 360 365
 Pro Gln Ala Phe Leu Asn Ser Lys Phe Ser Ile Pro Thr Thr Glu Glu
 370 375 380
 Lys Asn Gly Gln Lys Val Asp Lys Pro Met Glu Gln Gln Met Lys Asp
 385 390 395 400
 Arg Ala Asp Glu Asp Thr Val His Ala Tyr Lys Leu Ser Asn Pro Thr
 405 410 415
 Lys Thr Asp Thr Gly Val Tyr Val Glu Ala Ile His Asp Ile Gly Asp
 420 425 430
 Phe Thr Leu Thr Gly Gly Leu Arg Tyr Asp Arg Phe Lys Val Lys Thr
 435 440 445
 His Asp Gly Lys Thr Val Ser Ser Asn Leu Asn Pro Ser Phe Gly
 450 455 460
 Val Ile Trp Gln Pro His Glu His Trp Ser Phe Ser Ala Ser His Asn
 465 470 475 480
 Tyr Ala Ser Arg Ser Pro Arg Leu Tyr Asp Ala Leu Gln Thr His Gly
 485 490 495
 Lys Arg Gly Ile Ile Ser Ile Ala Asp Gly Thr Lys Ala Glu Arg Ala
 500 505 510
 Arg Asn Thr Glu Ile Gly Phe Asn Tyr Asn Asp Gly Thr Phe Ala Ala
 515 520 525
 Asn Gly Ser Tyr Phe Trp Gln Thr Ile Lys Asp Ala Leu Ala Asn Pro
 530 535 540
 Gln Asn Arg His Asp Ser Val Ala Val Arg Glu Ala Val Asn Ala Gly
 545 550 555 560
 Tyr Ile Lys Asn His Gly Tyr Glu Leu Gly Ala Ser Tyr Arg Thr Gly
 565 570 575
 Gly Leu Thr Ala Lys Val Gly Val Ser His Ser Lys Pro Arg Phe Tyr
 580 585 590
 Asp Thr His Lys Asp Lys Leu Leu Ser Ala Asn Pro Glu Phe Gly Ala
 595 600 605
 Gln Val Gly Arg Thr Trp Thr Ala Ser Leu Ala Tyr Arg Phe Gln Asn
 610 615 620
 Pro Asn Leu Glu Ile Gly Trp Arg Gly Arg Tyr Val Gln Lys Ala Thr
 625 630 635 640
 Gly Ser Ile Leu Ala Ala Gly Gln Lys Asp Arg Lys Gly Asn Leu Glu
 645 650 655
 Asn Val Val Arg Lys Gly Phe Gly Val Asn Asp Val Phe Ala Asn Trp
 660 665 670
 Lys Pro Leu Gly Lys Asp Thr Leu Asn Val Asn Leu Ser Val Asn Asn
 675 680 685
 Val Phe Asn Lys Phe Tyr Tyr Pro His Ser Gln Arg Trp Thr Asn Thr
 690 695 700
 Leu Pro Gly Val Gly Arg Asp Val Arg Leu Gly Val Asn Tyr Lys Phe
 705 710 715 720

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 35 40 45
 His Phe Asn Thr Ser Lys Pro Val Arg Leu Asp Asn Ile Leu Gln Ile
 50 55 60
 Arg His Thr Pro His Thr Asn Gly Leu Ser Asp Ile Tyr Leu Leu Asn
 65 70 75 80
 Asp Pro His Glu Ala Phe Ala Ala Arg Ala Ala Leu Ile Glu Ser Ala
 85 90 95
 Glu His Ser Leu Asp Leu Gln Tyr Tyr Ile Trp Arg Asn Asp Ile Ser
 100 105 110
 Gly Arg Leu Leu Phe Asn Leu Val Tyr Leu Ala Ala Glu Arg Gly Val
 115 120 125
 Arg Val Arg Leu Leu Leu Asp Asp Asn Asn Thr Arg Gly Leu Asp Asp
 130 135 140
 Leu Leu Leu Ala Leu Asp Ser His Pro Asn Ile Glu Val Arg Leu Phe
 145 150 155 160
 Asn Pro Phe Val Leu Arg Lys Trp Arg Ala Leu Gly Tyr Leu Thr Asp
 165 170 175
 Phe Pro Arg Leu Asn Arg Arg Met His Asn Lys Ser Phe Thr Ala Asp
 180 185 190
 Asn Arg Ala Thr Ile Leu Gly Gly Arg Asn Ile Gly Asp Glu Tyr Phe
 195 200 205
 Lys Val Gly Glu Asp Thr Val Phe Ala Asp Leu Asp Ile Leu Ala Thr
 210 215 220
 Gly Ser Val Val Gly Glu Val Ser His Asp Phe Asp Arg Tyr Trp Ala
 225 230 235 240
 Ser His Ser Ala His Asn Ala Thr Arg Ile Ile Arg Ser Gly Asn Ile
 245 250 255
 Gly Lys Gly Leu Gln Ala Leu Gly Tyr Asn Asp Glu Thr Ser Arg His
 260 265 270
 Ala Leu Leu Arg Tyr Arg Glu Thr Val Glu Gln Ser Pro Leu Tyr Gln
 275 280 285
 Lys Ile Gln Thr Gly Arg Ile Asp Trp Gln Ser Val Gln Thr Arg Leu
 290 295 300
 Ile Ser Asp Asp Pro Ala Lys Gly Leu Asp Arg Asp Arg Arg Lys Pro
 305 310 315 320
 Pro Ile Ala Gly Arg Leu Gln Asp Ala Leu Lys Gln Pro Glu Lys Ser
 325 330 335
 Val Tyr Leu Val Ser Pro Tyr Phe Val Pro Thr Lys Ser Gly Thr Asp
 340 345 350
 Ala Leu Ala Lys Leu Val Gln Asp Gly Ile Asp Val Thr Val Leu Thr
 355 360 365
 Asn Ser Leu Gln Ala Thr Asp Val Ala Ala Val His Ser Gly Tyr Val
 370 375 380
 Lys Tyr Arg Lys Pro Leu Leu Lys Ala Gly Ile Lys Leu Tyr Glu Leu
 385 390 395 400
 Gln Pro Asn His Ala Val Pro Ala Thr Lys Asp Lys Gly Leu Thr Gly
 405 410 415
 Ser Ser Val Thr Ser Leu His Ala Lys Thr Phe Ile Val Asp Gly Lys
 420 425 430
 Arg Ile Phe Ile Gly Ser Phe Asn Leu Asp Pro Arg Ser Ala Arg Leu
 435 440 445
 Asn Thr Glu Met Gly Val Val Ile Glu Ser Pro Lys Ile Ala Glu Gln
 450 455 460
 Met Glu Arg Thr Leu Ala Asp Thr Ser Pro Glu Tyr Ala Tyr Arg Val
 465 470 475 480

Thr	Leu	Asp	Arg	His	Asn	Arg	Leu	Gln	Trp	His	Asp	Pro	Ala	Thr	Arg
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Lys	Thr	Tyr	Pro	Asn	Glu	Pro	Glu	Ala	Lys	Leu	Trp	Lys	Arg	Ile	Ala
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				20			25					30			
Trp	Lys	Arg	Met	Lys	Ser	Phe	Ser	Leu	Phe	Glu	Val	Ile	Met	His	Trp
			35			40						45			
Thr	Ala	Ser	Leu	Asn	Lys	His	Thr	Cys	Arg	Ser	Tyr	Arg	Gly	Ser	Phe
			50			55					60				
Leu	Ser	Leu	Glu	Lys	Ile	Gly	Leu	Leu	Ser	Leu	Asp	Met	Asn	Leu	Gln
			65			70				75			80		
Glu	Phe	Ser	Leu	Leu	Asn	His	Asn	Leu	Ile	Leu	Asp	Ala	Ile	Lys	Lys
			85			90						95			
Val	Ser	Ser	Ala	Lys	Thr	Ser	Trp	Thr	Glu	Gly	Thr	Lys	Gln	Val	Arg
			100			105						110			
Ala	Ala	Ser	Tyr	Ile	Ser	Leu	Thr	Arg	Phe	Leu	Asn	Arg	Met	Thr	Gln
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<212> DNA
<213> Neisseria gonorrhoeae
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<213> Mus musculus

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Tyr Ser Asp Glu Phe Arg Ile His Phe Thr	Phe Asn Asp Phe Lys Arg					
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Asn Pro Ser Pro Arg Ser His Val Ser Pro	Ile Lys Gln Leu Asn Gly					
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Arg Thr Lys Thr Ala Ser Gly Ile Arg	Lys Val Val Arg Glu Leu Phe					
85	90	95				
His Lys Thr Asn Gly Ala Arg Glu Asn	Ala Ala Lys Ile Leu Val Val					
100	105	110				
Ile Thr Asp Gly Glu Lys Phe Gly Asp	Pro Leu Asp Tyr Lys Asp Val					
115	120	125				
Ile Pro Glu Ala Asp Arg Ala Gly Val	Ile Arg Tyr Val Ile Gly Val					
130	135	140				
Gly Asn Ala Phe Asn Lys Pro Gln Ser	Arg Arg Glu Leu Asp Thr Ile					
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<212> DNA
<213> Mus musculus

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<212> DNA
<213> Neisseria gonorrhoeae 1291

<400> 13

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<212> PRT
<213> Neisseria gonorrhoeae 1291

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Ser	Cys	Ser	Ser	Trp	Leu	Pro	Pro	Leu	Glu	Glu	Arg	Thr	Glu	Ser	Arg
							35		40		45				
His	Phe	Asn	Thr	Ser	Lys	Pro	Val	Leu	Leu	Asp	Asn	Ile	Leu	Gln	Ile
							50		55		60				
Arg	His	Thr	Pro	His	Asn	Asn	Gly	Leu	Ser	Asp	Ile	Tyr	Leu	Leu	Asp
							65		70		75		80		
Asp	Pro	His	Glu	Ala	Leu	Ala	Ala	Arg	Ala	Ala	Leu	Ile	Glu	Ser	Ala
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 Gly Lys Gly Leu Gln Ala Leu Gly Tyr Asn Asp Glu Thr Ser Arg His
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 Ala Leu Leu Arg Tyr Arg Glu Thr Val Glu Gln Ser Pro Leu Tyr Gln
 275 280 285
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 Ile Ser Asp Thr Pro Ala Lys Gly Leu Asp Arg Asp Arg Arg Lys Pro
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 Pro Ile Ala Gly Arg Leu Gln Asp Ala Leu Lys Gln Pro Glu Lys Ser
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 Val Tyr Leu Val Ser Pro Tyr Phe Val Pro Thr Lys Ser Gly Thr Asp
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 Ala Leu Ala Lys Leu Val Gln Asp Gly Ile Asp Val Thr Val Leu Thr
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 Asn Ser Leu Gln Ala Thr Asp Val Ala Ala Val His Ser Gly Tyr Val
 370 375 380
 Lys Tyr Arg Lys Pro Leu Leu Lys Ala Gly Ile Lys Leu Tyr Glu Leu
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 Gln Pro Asn His Ala Val Pro Ala Thr Lys Asp Lys Gly Leu Thr Gly
 405 410 415
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 Arg Ile Phe Ile Gly Ser Phe Asn Leu Asp Pro Arg Ser Ala Arg Leu
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 465 470 475 480
 Thr Leu Asp Lys His Asn Arg Leu Gln Trp His Asp Pro Ala Thr Arg
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<211> 1563

<212> DNA

<213> Neisseria gonorrhoeae 1090

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<213> Neisseria gonorrhoeae 1090

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His Phe Asn Thr Ser Lys Pro Val Leu Leu Asp Asn Ile Leu Gln Ile						
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Arg His Thr Pro His Asn Asn Gly Leu Ser Asp Ile Tyr Leu Leu Asp						
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Asp Pro His Glu Ala Phe Ala Ala Arg Ala Ala Leu Ile Glu Ser Ala						
85	90	95				
Glu His Ser Leu Asp Leu Gln Tyr Tyr Ile Trp Arg Asn Asp Ile Ser						
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115	120	125				
Arg Val Arg Leu Leu Leu Asp Asp Asn Asn Thr Arg Gly Leu Asp Asp						
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145	150	155	160			
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Phe Pro Arg Leu Asn Arg Arg Met His Asn Lys Ser Phe Thr Ala Asp						
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Lys	Thr	Tyr	Pro	Asn	Glu	Pro	Glu	Ala	Lys	Leu	Trp	Lys	Arg	Ile	Ala
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 <211> 525
 <212> PRT
 <213> Neisseria gonorrhoeae ms11

<400> 18
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 Ser Cys Ser Ser Trp Leu Pro Pro Leu Glu Glu Arg Thr Glu Ser Arg
 35 40 45
 His Phe Asn Thr Ser Lys Pro Val Leu Leu Asp Asn Ile Leu Gln Ile
 50 55 60
 Arg His Thr Pro His Asn Asn Gly Leu Ser Asp Ile Tyr Leu Leu Asp
 65 70 75 80
 Asp Pro His Glu Ala Phe Ala Ala Arg Ala Ala Leu Ile Glu Ser Ala
 85 90 95
 Glu His Ser Leu Asp Leu Gln Tyr Tyr Ile Trp Arg Asn Asp Ile Ser
 100 105 110
 Gly Arg Leu Leu Phe Asn Leu Met Tyr Leu Ala Ala Glu Arg Gly Val
 115 120 125
 Arg Val Arg Leu Leu Leu Asp Asp Asn Asn Thr Arg Gly Leu Asp Asp
 130 135 140
 Leu Leu Leu Ala Leu Asp Ser His Pro Asn Ile Glu Val Arg Leu Phe
 145 150 155 160
 Asn Pro Phe Val Leu Arg Lys Trp Arg Ala Leu Gly Tyr Leu Thr Asp
 165 170 175
 Phe Pro Arg Leu Asn Arg Arg Met His Asn Lys Ser Phe Thr Ala Asp
 180 185 190
 Asn Arg Ala Thr Ile Leu Gly Gly Arg Asn Ile Gly Asp Glu Tyr Phe
 195 200 205
 Lys Val Gly Glu Asp Thr Val Phe Ala Asp Leu Asp Ile Leu Ala Thr
 210 215 220
 Gly Ser Val Val Gly Glu Val Ser His Asp Phe Asp Arg Tyr Trp Ala
 225 230 235 240
 Ser His Ser Ala His Asn Ala Thr Arg Ile Ile Arg Ser Gly Asn Ile
 245 250 255
 Gly Lys Gly Leu Gln Ala Leu Gly Tyr Asn Asp Glu Thr Ser Arg His
 260 265 270
 Ala Leu Leu Arg Tyr Arg Glu Thr Val Glu Gln Ser Pro Phe Tyr Gln
 275 280 285
 Lys Ile Gln Thr Gly Arg Ile Asp Trp Gln Ser Val Gln Thr Arg Leu
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 Ile Ser Asp Ser Pro Ala Lys Gly Leu Asp Arg Asp Arg Arg Lys Pro
 305 310 315 320
 Pro Ile Ala Gly Arg Leu Gln Asp Ala Leu Lys Gln Pro Glu Lys Ser
 325 330 335
 Val Tyr Leu Val Ser Pro Tyr Phe Val Pro Thr Lys Ser Gly Thr Asp
 340 345 350
 Ala Leu Ala Lys Leu Val Gln Asp Gly Ile Asp Val Thr Val Leu Thr
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 Asn Ser Leu Gln Ala Thr Asp Val Ala Ala Val His Ser Gly Tyr Val
 370 375 380
 Lys Tyr Arg Lys Pro Leu Leu Lys Ala Gly Ile Lys Leu Tyr Glu Leu
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 Gln Pro Asn His Ala Val Pro Ala Thr Lys Asp Lys Gly Leu Thr Gly
 405 410 415
 Ser Ser Val Thr Ser Leu His Ala Lys Thr Phe Ile Val Asp Gly Lys
 420 425 430
 Arg Ile Phe Ile Gly Ser Phe Asn Leu Asp Pro Arg Ser Ala Arg Leu
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Asn	Thr	Glu	Met	Gly	Val	Val	Ile	Glu	Ser	Pro	Lys	Ile	Ala	Glu	Gln
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Met	Glu	Arg	Thr	Leu	Ala	Asp	Thr	Thr	Pro	Glu	Tyr	Ala	Tyr	Arg	Val
465				470						475				480	
Thr	Leu	Asp	Lys	His	Asn	Arg	Leu	Gln	Trp	His	Asp	Pro	Ala	Thr	Arg
				485				490				495			
Lys	Thr	Tyr	Pro	Asn	Glu	Pro	Glu	Ala	Lys	Leu	Trp	Lys	Arg	Ile	Ala
				500				505				510			
Ala	Lys	Ile	Leu	Ser	Leu	Leu	Pro	Ile	Glu	Gly	Leu	Leu			
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<210> 19

<211> 1564

<212> DNA

<213> Neisseria meningitidis B

<220>

<221> misc_feature

<222> (1)...(1564)

<223> n = a or t or g or c.

<400> 19

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<210> 20

<211> 525

<212> PRT

<213> Neisseria meningitidis B

<400> 20

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								20			25			30	
Ser	Cys	Ser	Ser	Trp	Leu	Pro	Pro	Leu	Glu	Glu	Arg	Thr	Glu	Ser	Arg
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Ser	His	Ser	Ala	His	Asn	Ala	Thr	Arg	Ile	Ile	Arg	Ser	Gly	Asn	Ile
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					290			295			300				
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Val	Tyr	Leu	Val	Ser	Pro	Tyr	Phe	Val	Pro	Thr	Lys	Ser	Gly	Thr	Asp
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Ala	Leu	Ala	Lys	Leu	Val	Gln	Asp	Gly	Ile	Asp	Val	Thr	Val	Leu	Thr
					355			360			365				
Asn	Ser	Leu	Gln	Ala	Thr	Asp	Val	Ala	Ala	Val	His	Ser	Gly	Tyr	Val
					370			375			380				
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Gln	Pro	Asn	His	Ala	Val	Pro	Ala	Thr	Lys	Asp	Lys	Gly	Leu	Thr	Gly
					405			410			415				
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					420			425			430				
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					450			455			460				
Met	Glu	Arg	Thr	Leu	Ala	Asp	Thr	Ser	Pro	Glu	Tyr	Ala	Tyr	Arg	Val
					465			470			475			480	
Thr	Leu	Asp	Arg	His	Asn	Arg	Leu	Gln	Trp	His	Asp	Pro	Ala	Thr	Arg
					485			490			495				
Lys	Thr	Tyr	Pro	Asn	Glu	Pro	Glu	Ala	Lys	Leu	Trp	Lys	Arg	Ile	Ala
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<212> PRT
<213> Neisseria gonorrhoeae

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<210> 22
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<212> DNA
<213> Artificial Sequence

<220>
<223> A synthetic primer used in a PCR.

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<210> 23
<211> 42
<212> DNA
<213> Artificial Sequence

<220>
<223> A synthetic primer used in a PCR.

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<210> 24
<211> 1561
<212> DNA
<213> Neisseria gonorrhoeae

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<211> 1563
<212> DNA
<213> Neisseria gonorrhoeae

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<210> 26
<211> 1561
<212> DNA
<213> Neisseria gonorrhoeae

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<210> 27
<211> 1561
<212> DNA
<213> Neisseria gonorrhoeae

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